

(Continued from 4(3):188)

9. Deciduous Woodland (*Quercus* consociation); Plate 13.

This formation attains its greatest development on the ridges on the southern slopes of Volcán Santa Marta between elevations of 400 and 1,500 feet, i.e., above the Savanna. However, small, disjunct stands are found above the *Pinus-Quercus* Associates and on the southern slopes of Volcán San Martín Pajapan at elevations between 2,300 and 2,500 feet.

Ground cover is of variable density and consists of short grasses and sedges of which the most common are *Eragrostis* sp., *Rynchospora globosa*, *Paspalum pectinatum*, *Paspalum plicatulum*, and *Sporobolus cubensis*. *Oxalis neaei* is also common. Dense stands of *Calliandra grandiflora* and *Conostegia xalapensis* are frequent.

Quercus peduncularis, which attains a maximum height of 30 to 40 feet is the most common species of tree although *Quercus oleoides* and *Quercus ghiesbreghtii* are common. Other trees include *Byrsonima crassifolia*, *Miconia argentea*, and *Acalypha unibracteata*.

Towards the end of the dry season (mid-May), most of the oaks drop their leaves and blossom. New growth appears shortly thereafter so that the trees are not leafless for more than one or two weeks.

Epiphytes are fairly common in the taller trees, especially at elevations above 2,000 feet.

This formation appears to be a phase of the Orchard Savanna of Beard (1953) in which species of *Quercus* predominate. As stated previously, the oak forest exists principally on ridges whereas the Savanna is found on less coarse topography. Therefore, the soils within the oak forest (and which are thin, sandy, and range in color from grey to yellow) probably are more heavily leached and more efficiently drained than those in the Savanna. These two edaphic factors possibly are responsible for the existence of the Deciduous Woodland, which might be termed a modified Orchard Savanna.

10. *Pinus-Quercus* Associates; Plate 14.

The pine-oak forest is restricted to a relatively small area on the southern slopes of Volcán Santa Marta. The forest occurs on the upper slopes and crests of many of the numerous ridges between elevations of 1,600 and 3,000 feet.

Ground vegetation is of variable density and consists primarily of numerous grasses and sedges of which the most common are *Paspalum pectinatum*, *Paspalum plicatulum*, *Eragrostis*



PLATE 14

Pine-oak forest on Volcán Santa Marta near Ocotil Chico. May 1965, 1,900 feet.

sp., *Sporobolus cubensis*, *Rynchospora globosa*, *Bulbostylis papillosa*, and *Dichromena ciliata*. Other plants include *Croton repens*, *Borreria suaveolens*, *Crusea calcocephala*, *Calliandra grandiflora*, *Eupatorium incomptum*, *Calea zacatechichi*, *Ruellia fluviatilis*, *Stevia rhombifolia*, *Cordia spinescens*, *Lemourouxia viscosa*, *Conyza chilensis*, *Escobedia laevis*, *Turnera ulmifolia*, *Calea longipedicellata*, *Cassia hispidula*, *Vernonia leiocarpa*, *Salvia shannonii*, *Calea cacosmoides* (?), and *Vernonia argyropappa*. The cycad *Zamia loddigesii* is locally common.

Pinus oocarpa is the dominant tree species although *Quercus conspersa* and *Quercus ghiesbreghtii* occur rather commonly throughout the formation. Trees never form dense thickets or forests but are relatively widely distributed in open stands.

The pine-oak community represents one of the most interesting curiosities and enigmas of the Sierra de Tuxtla for the formation has such a restricted distribution. The nearest comparable formation occurs in the Department of Tuxtepec, Oaxaca, 90 miles away. The Sierra's *Pinus Quercus* community appears to be a subclimax community, which probably corresponds to the "Pine Savanna" of Beard (1953) and which is considered by that author to be a phase of the "Orchard Savanna." Beard states that pines may and usually do invade savannas when a seed source is near. However, in the Sierra pines do not occur in either the typical Savanna or the Deciduous Woodland (modified savanna), formations that exist in areas more proximal to the pine seed source in Oaxaca. Hence, additional factors probably are responsible for the limited extent of the pine-oak community. Two suggestions are offered. First, the community exists only on the crests of steep ridges, areas in which soils are extremely thin and lateritic (Friedlaender, 1923) and hence relatively poor in nutrients. Furthermore, most of the Sierra has been settled by Indians—relatively recently by Popolucas and Aztecs and formerly by Olmecs—for over 2,000 years (see Ross, 1966). Today most of the Indian villages on the Santa Marta massif are restricted to ridge crests and information gathered from Popolucan legends and stories indicates that this pattern of settlement is an ancient one. Thus the ridge crests have been subjected to severe soil disturbances for at least hundreds of years. Numerous works, e.g., those of Pessin (1937), Stoate (1950), and Merrifield, Foil, and Hansbrough (1964), have shown that pines can grow well in soils with relatively low concentrations of nutrients and which are too poor for many



PLATE 15

Littoral Woodland near Zapopan; view is towards the southeast. May 1965, sea level.

plant species. Therefore, I conclude that the ridge crests represent a favorable habitat for pines and a relatively unfavorable one for many (or even most) other species of trees. Second, the Popolucas today engage (and have engaged for hundreds of years) in annual burnings of the pine lands. These burnings significantly increase the geographic extent of the pine-oak community for whenever fire is excluded from an area for several consecutive years a heavy ground cover consisting of numerous grasses, shrubs, and oak saplings develops. These saplings develop later into trees; pine seedlings usually are never present (Ross, 1966). Therefore, I conclude that the pine-oak community in the Santa Marta area is a seral stage within the Deciduous Woodland (which in turn is a modified savanna) and which has become established because of favorable edaphic conditions and is being maintained in its present extent by man-caused fires.

The ravines within the *Pinus-Quercus* Associates contain elements of the Semi-Evergreen Seasonal Forest.

DRY EVERGREEN FORMATION

11. Littoral Woodland or Dry Evergreen Woodland (*Ficus-Hibiscus* Association); Plate 15.

This formation occurs along the seashore between the high water mark and the volcanic headlands fronting the Gulf. Hence the formation is variable in width, extending inland for only a few feet or to 500 to 1,000 feet. Strong winds and salt spray are common throughout.

Along the sandy beaches the following plant species are common: *Cyperus ligularis*, *Cyperus articulatus*, *Cenchrus incertus*, *Distichlis spicata* or *Sporobolus virginicus*, *Chloris petraea*, *Vigna luteola*, *Ipomoea stolonifera*, and *Ipomoea pes-caprae*.

Farther inland are small, gnarled, and windswept trees and shrubs, which are found both in small open patches and in extensive dense thickets. These woody species include *Ficus* spp., *Hibiscus tiliaceus*, *Pachira aquatica*, and *Piper cordovan*.

SWAMP FORMATIONS

12. Swamp Forest (*Pachira-Ficus* Association); Plate 16.

The Swamp Forest is located at low elevations near the Gulf and bordering several of the large streams, e.g., Río Zapoa-



PLATE 16
Swamp Forest near Zapopan. May 1965, sea level.

pan, Río Carizal, Río Salado, Río Yougualtajapan, and Río Máquina. The ground in this formation is waterlogged during most of the year and is frequently inundated for long periods during the rainy season.

The understory is relatively open and is composed principally of *Chamaedorea tepejilote*, *Piper cordovan*, and numerous saplings.

The single tree stratum ranges between 40 and 60 feet in height and is composed principally of *Pachira aquatica*, *Ficus* spp. (including *Ficus obtusifolia*), *Hibiscus tiliaceus*, and *Pleuranthodendron mexicana*.

Many trees exhibit buttressing and stiltling. Lianas and epiphytes are common.

13. Mangrove Woodland (*Rhizophora* consociation); Plate 17.

This formation is restricted to the margins of Bahía Sontecomapan. *Rhizophora mangle* is the only principal species and forms thick, closed stands up to 40 or 60 feet in height. Stilt roots and pneumatophores are common.

UNRESTRICTED MISCELLANEOUS FORMATIONS

14. Recently Abandoned Milpas; Plate 18.

When a milpa or corn field is abandoned the field is invaded by numerous grasses and annuals. The latter include *Melampodium divaricatum* and *Ageratum conyzoides*, both of which blossom in the spring and which are replaced in the summer by *Baltimora recta*, *Bidens pilosa* var. *bimucronata*, and *Melampodium kunthianum*. In subsequent years these species usually are replaced by more woody plants such as *Polymnia maculata*, *Cordia spinescens*, *Hamelia patens*, *Piper auritum*, *Conostegia xalapensis* (Andrle, 1964), *Heliotropium indicum*, *Calliandra grandiflora*, and *Vernonia leiocarpa*.

15. Pastures; Plate 19.

Areas that are used consistently for the grazing of cattle and/or horses usually develop rather distinctive floristic characteristics. There are numerous patches or clumps of relatively short vegetation composed of *Cordia alliodora*, *Croton soliman*, *Picramnia andicola*, *Heliotropium indicum*, *Crotalaria vitellina*, *Urera elata*, *Solanum ochraceo-ferrugineum*, and *Piper auritum*. Trees, which are relatively few in number, include *Inga spuria*, *Inga leptoloba*, *Cassia spectabilis*, *Cassia occidentalis*, *Annona reticulata*, *Annona muricata*, *Trema micrantha*, and *Pleuranthodendron mexicana*.



PLATE 17
Mangrove Woodland along
Bahia Sontecomapan. May 1962, sea level.
Photograph by R. F. Andrie.

16. Hedgerows; Plate 20.

Corn fields and pastures in the more heavily cultivated sections of the Sierra, e.g., in the vicinity of the larger cities and towns, usually are bordered by fences about which is found a varied but characteristic assemblage of plants. Where best developed these rows may be as wide as 15 to 20 feet. The undergrowth usually is a tangle of vegetation composed of *Cordia spinescens*, *Urera elata*, *Passiflora serratifolia*, and *Passiflora coriacea*. Tree species attain maximum heights of 20 to 30 feet and include *Bursera simaruba*, *Gliricidia sepium*, *Erythrina americana* (Andrle, 1964), *Zanthoxylum elephantiasis*, *Ficus padifolia*, *Inga spuria*, *Inga leptoloba*, *Cassia spectabilis*, *Annona muricata*, and *Annona reticulata*.

V. ACCOUNTS OF BUTTERFLY SPECIES IN THE SIERRA DE TUXTLA

Plan of the Species Accounts

Unfortunately, systematics of the Lepidoptera, especially tropical forms, is in a relatively unstable state. Indeed, between one-third and one-half of the species listed in the "Catalogo Sistemático y Zoogeográfico de los Lepidópteros Mexicanos" (Hoffmann, 1940) do not bear today the same generic and specific names. For this reason I have had to rely on numerous and isolated taxonomic works in addition to personal correspondence in order to present here a reasonably accurate and modern systematic arrangement of taxons. In particular, I have followed Munroe and Ehrlich (1960) for the arrangement of the Papilionidae, Klots (1931) for the Pieridae, Fox (1956) for the Ithomiidae, Michener (1942) and Emsley (1963) for the Heliconiinae (Nymphalidae), Forbes (1944) and Higgins (1960) for the Argyninidi (Nymphalidae), Chermock (1950) for the Liminitidi (Nymphalidae), and Clench (1955) for the Lycaenidae and Riodinidae. Thus, it is hoped that this paper, although not intended to be taxonomically oriented, nevertheless will represent a significant contribution to the systematic literature and serve as a modern reference for students of Neotropical Lepidoptera.

Each species account is introduced by the scientific name of the species. Following this heading and under the caption



PLATE 18

Recently Abandoned Milpa on Volcán San Martín Tuxtla. Field has remained fallow for approximately one year. June 1962, 2,350 feet. Photograph by R. F. Andrie.

SPECIMEN or SPECIMENS are the field data. For those species that previously have been recorded from the Sierra, the data have been condensed and include number of specimens of each sex, maximum-minimum altitudes (elevations were measured with a Taylor "Forecaster-Altimeter" calibrated to measure in 200 foot intervals), and earliest-latest collection dates. For those species that represent new records for the Sierra or which are rare, the complete field data are given (mileages represent straight-line distances). If a particular specimen is in a collection other than my own, initials of the collection are included. The following initials are employed: KHW = personal collection of Kent H. Wilson and LSUMZ = Louisiana State University Museum of Zoology. Sequence of entries is determined primarily by altitude (lowest elevation listed first) and secondarily by collection date (the earliest day and month listed first). Thus, the first and last entries give the altitudinal range of the species.

Following the data is a discussion paragraph. In the first sentence I express the relative abundance of the species in the Sierra by employing four general terms—abundant, common, uncommon, and rare. I consider a species to be abundant if ten or more individuals of it were noted every (or almost every) day, common when less than ten individuals were noted each day, and uncommon when only three to five individuals were seen at fairly wide intervals of time. Those species collected only after very long time lapses or only once or twice during my residence are designated as rare. Unfortunately, these terms are extremely difficult to standardize when referring to animals in the tropics because of the overwhelming array of inconspicuous and virtually uncollectible habitats. Therefore, in many cases the evaluation of the relative abundance of a species may be very biased and not reflect the actual status of the species. In the second sentence (and frequently in the latter part of the first) I give the principal plant formation or formations inhabited by the species. Sequence of formations is based on decreasing relative abundance of the butterfly species. The remaining sentences are devoted to general comments, principally on the ecology and ethology of the species, that I consider pertinent. When a species previously has not been recorded from the Sierra, the nearest recorded locale is given in the last sentence of the paragraph.



PLATE 19
Pasture near Zapopan. May 1965, sea level.

Accounts
FAMILY PAPILIONIDAE
SUBFAMILY Papilioninae

TRIBE Graphiini

SUBTRIBE Graphiiti

1. *Graphium phaon* (Boisduval)

SPECIMENS: 10 ♂♂, 1 ♀; 1,100-1,800 feet; 12 May-3 Oct.

This species is common along hedgerows, particularly in the vicinity of Lago Catemaca. Most butterflies were collected as they imbibed moisture from wet sand and soil. The flight is relatively rapid, erratic, and usually between two and four feet of the ground. Two of the 11 specimens collected exhibit a loss of marginal and submarginal greenish dots on the dorsal fore wings and a replacement of the postmedian-median row of greenish scales on the dorsal hind wings with red scales. This morphotype, which has been named form *eridamas* (Reakirt), bears a close resemblance to *Parides polyzelus* (Papilioninae: Troidini), a species that is abundant along hedgerows and the margins of forests.

2. *Graphium branchus* (Doubleday)

SPECIMENS: 3 ♂♂; 2 mi. NE Catemaco, 1,100 feet, 27 July 1962, 1 ♂; 3 Aug. 1962, 1 ♂; Ocotal Grande, 1,800 feet, 15 May 1965, 1 ♂.

This tailless *Graphium* is uncommon and was collected along the margins of the Semi-Evergreen Seasonal Forest only in late spring and summer. The flight is relatively close to the ground (usually within three or four feet) and similar in velocity to that of *Parides* spp. This species was recorded previously from Veracruz only from the "Sierra Madre Oriental" (Hoffmann, 1940).

3. *Graphium belesis* (Bates)

SPECIMENS: 18 ♂♂, 6 ♀♀; 1.5 mi. SSE Sontecomapan, 900 feet, 14 July 1962, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 1 July 1963, 1 ♂; 2 July 1962, 1 ♀; 9 July 1962, 1 ♀ (KHW); 27 July 1962, 2 ♂♂ (1 KHW); 9 Aug. 1962, 1 ♂; 31 Aug. 1962, 1 ♂;



PLATE 20

Hedgerow near San Andrés Tuxtla. Although the predominant tree in the photograph is *Bursera sinarubra*, numerous other species of trees and shrubs usually are present. June 1962, 1,300 feet. Photograph by R. F. Andrie.

8 Sept. 1962, 1 ♀ : 4.5 mi. NE Catemaco, 1,100 feet, 26 June 1962, 1 ♂ : 4 mi. S Coyame, 1,200 feet, 25 June 1962, 3 ♂ ♂ : 2.5 mi. SW Sontecomapan, 1,300 feet, 26 June 1962, 1 ♂ : 1 mi. N So-teapan, 1,400 feet, 28 March 1965, 1 ♂ ; 29 March 1965, 2 ♂ ♂ : 1 mi. SSW Vigía, 1,800 feet, 18 March 1965, 1 ♀ : 1 mi. NNE Ocotál Chico, 2,000 feet, 1 ♂ , 1 ♀ : 2 mi. NNW Ocotál Chico, 3,800 feet, 1 ♂ . Reared specimens: 2 mi. NE Catemaco, 1,100 feet, emerged 30 July 1962, 1 ♂ (KHW); emerged 3 Sept. 1962, 1 ♂ ; emerged 6 Sept. 1962, 1 ♂ .

This species is abundant during the spring and summer months along the margins of the Semi-Evergreen Seasonal Forest and Hedgerows, particularly in the vicinity of Lago Catemaco. Adults are attracted to wet sand and soil. The flight is usually slow and within three feet of the ground, a behavior that is atypical for most members of the genus. Of the 24 specimens collected, two have faint white blotches on their dorsal fore wings. This morphotype, named form *hephaestion* (Felder), bears a close resemblance to females of *Parides* spp. Larvae (described in Ross, 1964b) were found occasionally on *Annona muricata*, a tree called "Guanabana" by the local residents and commonly planted around habitations. *G. belesis* was recorded previously from Veracruz only from the "Sierra Madre Oriental" (Hoffmann, 1940).

4. *Graphium philolaus* (Boisduval)

SPECIMENS: 3 ♂ ♂ , 1 ♀ ; 1,100-1,200 feet; 20, 27 June.

Although only four specimens were taken, the species is common during the spring and early summer months, in pastures and along sunny road sides in the vicinity of Lago Catemaco. The butterflies are attracted to moist earth and to the flowers of *Inga leptoloba*, a tree common in pastures. *G. philolaus* exhibits the high, soaring flight that is characteristic of most species in the genus.

5. *Graphium epidaus epidaus* (Doubleday, Westwood, & Hewitson)

SPECIMENS: 11 ♂ ♂ , 3 ♀ ♀ ; 1,100 feet; 20 June-27 July.

Adults are very abundant during the spring and summer months in Pastures, Recently Abandoned Milpas, and along Hedgerows and sunny road sides throughout the Sierra but particularly in the vicinity of Lago Catemaco. This distribution correlates with the distribution of the larval food plant *Annona reticulata*, a tree that produces sweet fruit and which is cultivated frequently by the local inhabitants. Adults exhibit the

characteristic *Graphium* flight and are attracted to mud puddles and damp soil and sand. Immature stages (described in Ross, 1964b) were found commonly on the leaves of the food plant during the summer months.

6. *Graphium agesilaus neosilaus* (Hoffer)

SPECIMENS: 4 ♂♂; 2 mi. NE Catemaco, 1,100 feet, 2 July 1962, 2 ♂♂: 1 mi. N Soteapan, 1,400 feet, 28 March 1965, 2 ♂♂.

This "kite swallowtail" is uncommon and was collected only along sunny road sides during spring and early summer. All four specimens were taken as they drank from damp sand. The previous Veracruz record is the "Sierra Madre Oriental" (Hoffmann, 1940).

7. *Graphium calliste calliste* (Bates)

SPECIMENS: 16 ♂♂, 1 ♀; 4,100-5,100 feet; 3 March-7 April.

G. c. calliste is abundant above the canopies of the Montane Thicket and Elfin Woodland during March and April. The butterflies descend to within a few feet of the ground usually only to visit flowers, particularly those of *Schistocarpha* sp. (a composite that is common on the open, sunny ridges and crater walls).

TRIBE Troidini

SUBTRIBE Battiti

8. *Battus polydamas* (Linnaeus)

SPECIMENS: 6 ♂♂, 4 ♀♀; 0-2,700 feet; 10 March-14 Aug.

B. polydamas is abundant in the Littoral Woodland and common in all other formations except the Montane series. Adults are attracted to the flowers of *Lantana camara* and to moist soil and sand. The flight is relatively rapid and usually within eight feet of the ground. When pinched, specimens protruded their yellowish abdominal scent glands, which emitted an acrid odor. Larvae were found on *Aristolochia asclepiadifolia*, a vine that is common in the vicinity of the Popoluca Indian villages on the Santa Marta massif.

9. *Battus belus varus* (Kollar)

SPECIMENS: 4 ♀♀; 700-1,400 feet; 20 May-14 July.

This papilionid is locally common, being seen most frequently along the margins of the Semi-Evergreen Seasonal Forest in the ravines within the oak and pine-oak forests. The flight usually is above ten feet of the ground. Two of the four specimens were taken as they fed on the blossoms of *Inga spuria*. The abdominal scent glands produce an acrid odor.

10. *Battus laodamas copanae* (Reakirt)

SPECIMENS: 1 ♂, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 24 June 1962, 1 ♀; 28 June 1962, 1 ♂.

This rare species was collected only in Pastures; the female as it fed on the blossoms of *Lantana camara* and the male as it flew about the blossoms of *Inga spuria*. The flight is relatively rapid and erratic.

SUBTRIBE Troiditi

11. *Parides photinus* (Doubleday)

SPECIMENS: 8 ♂♂, 5 ♀♀; 700-5,100 feet; 30 March-30 Aug.

This species is common in all the Montane Formations and the Semi-Evergreen Seasonal Forest on the Santa Marta massif. The butterflies are particularly numerous along sunny trails and in bright glades with the forests. The flight is relatively slow and usually within four feet of the ground. However, when individuals are disturbed they fly rapidly with powerful wing beats. The abdominal scent glands emitted an acrid odor when the butterflies were pinched. The larval food plant is *Aristolochia asclepiadifolia*, the same as that of *Battus polydamas*. Immature stages are described elsewhere (Ross, 1964d).

12. *Parides montezuma* (Westwood)

SPECIMENS: 4 ♂♂; 1,050-2,000 feet; 1 Aug.-29 Oct.

This tailed *Parides* is locally common, being found most frequently in the Recently Abandoned Milpas surrounding the Indian villages of Mecayapan and San Fernando. The butterflies fly fairly rapidly between four and ten feet of the ground and are attracted to flowers. The abdominal scent glands produce an acrid odor.

13. *Parides polyzelus polyzelus* (Felder)

SPECIMENS: 21 ♂♂, 6 ♀♀; 0-1,900 feet; 13 March-5 Oct.

This papilionid is abundant in the Semi-Evergreen Seasonal Forest, Lower Montane Rain Forest, Littoral Woodland, Swamp Forest, and along Hedgerows. In fact, this species is the most common forest-inhabiting swallowtail. The flight is relatively slow, weak, and usually within three or four feet of the ground. The abdominal scent glands produce acrid odors.

14. *Parides sesostris zestos* (Gray)

SPECIMENS: 4 ♂♂, 1 ♀; 0-1,750 feet; 12 July-29 Oct.

This swallowtail is locally common, being found in the Lower Montane Rain Forest, Semi-Evergreen Seasonal Forest, Littoral

Woodland, and Swamp Forest. It and the following two species, *P. iphidamas* and *P. arcas mylotes*, in addition to being very similar in appearance, seem to be very closely related ecologically and ethologically. For example, all three species prefer the relatively bright or sunlit sections of mature forests below an elevation of approximately 3,000 feet and usually are found in localized assemblages. The flight is rapid and within three to five feet of the ground. As reported in Ross (1964a), the butterflies appear to have definite "flyways" from which they very rarely deviate. These flyways usually are sections of relatively wide trails. The abdominal scent glands produce an acrid odor.

15. *Parides iphidamas* (Fabricius)

SPECIMENS: 16 ♂♂, 9 ♀♀; 0-2,450 feet; 13 March-18 Oct.

This species is locally common (more common than *P. sesostris zestos*) in the Lower Montane Rain Forest, Semi-Evergreen Seasonal Forest, Littoral Woodland, and Swamp Forest. The flight behavior is the same as that of *P. sesostris zestos*. The abdominal scent glands, as those of other members of the genus, produce an acrid odor.

16. *Parides arcas mylotes* (Bates)

SPECIMENS: 17 ♂♂, 13 ♀♀; 0-2,700 feet; 13 March-24 Oct.

P. arcas mylotes is locally abundant in the Lower Montane Rain Forest, Semi-Evergreen Seasonal Forest, Littoral Woodland, and Swamp Forest. The flight behavior is the same as that described under *P. sesostris zestos*. The abdominal scent glands emit an acrid odor.

TRIBE Papilionini

17. *Papilio polyxenes asterius* Stoll

SPECIMENS: 3 ♂♂, 2 ♀♀; 1,100-2,700 feet; 5 May-14 Sept.

This "fluted swallowtail" is uncommon and was collected only in the *Pinus-Quercus* Associates of the Deciduous Woodland and in a small, disjunct patch of oak forest NNE of Catemaco. Two of the five specimens are typical *P. polyxenes asterius* whereas the remaining three are of the morphotype named form *americus* Kollar. The flight is characteristic of most members of the genus *Papilio*—rather rapid with strong wing beats and usually between six and 15 feet of the ground.

18. *Papilio thoas autocles* Rothschild & Jordan

SPECIMENS: 12 ♂♂, 5 ♀♀; 0-2,700 feet; 12 March-30 Sept.

This species is the most common swallowtail in the Sierra and occurs in Recently Abandoned Milpas, Pastures, Semi-Evergreen Seasonal Forest, Littoral Woodland, and along Hedgerows and

most sunny road sides. The butterflies visit the blossoms of numerous species of plants and mud puddles. The flight is typical of *Papilio* spp. Larvae, described in Ross (1964d) were found on *Piper marginatum* and *Piper kerberi*, both of which are common along shaded stream banks in the Semi-Evergreen Seasonal Forest on the Santa Marta massif.

19. *Papilio androgeus epidaureus* Godman & Salvin

SPECIMENS: 7 ♂♂, 1 ♀; 1,100-5,100 feet; 24 March-13 Oct.

This papilionid is common above the canopy of the Elfin Woodland. Most butterflies were collected as they flew in circular patterns between eight and 12 feet above the peaks of Cerro Tuxtla and Volcán Santa Marta. This behavior is commonly known as "hilltopping." Larvae (described in Ross, 1964b) were found during the summer months on *Zanthoxylum elephantiasis*, a small tree that is common in the hedgerows bordering Lago Catemaco.

20. *Papilio anchisiades idaeus* Fabricius

SPECIMENS: 6 ♂♂, 8 ♀♀; 500-1,800 feet; 20 June-9 Oct.

This swallowtail is common in Pastures and along Hedgerows in the vicinity of Lago Catemaco and most towns and villages throughout the Sierra where citrus trees are cultivated, *Citrus* spp. being the larval food plant. The flight is typical of most species in the genus. Immature stages are described in Ross (1964b).

21. *Papilio victorinus victorinus* Doubleday

SPECIMENS: 1 ♂, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 28 July 1962, 1 ♂; 2.5 mi. NNW Ocotil Chico, 3,000 feet, 12 April 1965, 1 ♀.

This species is rare; the male was collected in a sunny glade within the Semi-Evergreen Seasonal Forest and the female along a wide logging road in the Montane Rain Forest. Both specimens were flying rapidly approximately ten to 12 feet above the ground when collected.

FAMILY PIERIDAE
SUBFAMILY Dismorphiinae

22. *Dismorphia (Dismorphia) praxinoe* (Doubleday)

SPECIMENS: 8 ♂♂, 12 ♀♀; 0-4,300 feet; 13 March-17 Nov.

D. praxinoe is locally common, being found principally in the Lower Montane Rain Forest, Montane Rain Forest, Semi-Evergreen Seasonal Forest, and Swamp Forest. The flight is very weak and the butterflies very rarely rise more than four feet above the forest floor. As reported previously (Ross, 1964a), this slow, weak flight is very atypical for members of the Pieridae but very similar to that of many species in the family Ithomiidae.

23. *Dismorphia (Dismorphia) fortunata* (Lucas)

SPECIMENS: 34 ♂♂, 19 ♀♀; 700-5,000 feet; 9 Feb.-30 Oct.

This species locally abundant and found principally in the Lower Montane Rain Forest, Montane Rain Forest, Semi-Evergreen Seasonal Forest, and Swamp Forest. The flight is weak and slow, much more so than that of the related species *D. praxinoe*. The butterflies usually fly within one to two feet of the forest floor. This flight behavior is very similar to that of several species of ithomiids, principally *Oleria paula*, *Pteronymia cotyto*, and *Hypoleria cassotis* (see Ross, 1964a also).

24. *Dismorphia (Dismorphia) euryope* (Lucas)

SPECIMENS: 11 ♂♂, 1 ♀; 3 mi. NNW Ocotil Chico, 4,100 feet, 23 Feb. 1965, 1 ♂; 12 March 1965, 1 ♀; 4,300 feet, 7 March 1965, 1 ♂; 4,400 feet, 17 June 1963, 1 ♂; 30 July 1963, 3 ♂♂; 4,800 feet, 5 April 1965, 1 ♂; 16 July 1963, 2 ♂♂: Peak Volcán Santa Marta, 5,000 feet, 11 June 1963, 1 ♂; 5,100 feet, 26 May 1965, 1 ♂.

This pierid is local and uncommon; all specimens were collected in the Montane Thicket and Elfin Woodland on Volcán Santa Marta. The flight, particularly that of the males, is more rapid and erratic than that of the preceding two species but still slower than that of most pierids. The butterflies were collected most frequently as they rested on leaves in relatively bright or sunny glades within the forests. The body fluids of pinched specimens smelled sour. The previous Veracruz record is the "Sierra Madre Oriental" (Hoffmann, 1940).

(to be continued)